

which they have been subjected on their downward course; but, at the same time, he distinguishes between these veins—the result of stratification, and others which he terms bands of infiltration, and which he believes to have been formed by the infiltration and freezing of water.

The late Principal J. D. Forbes maintained ("Occasional Papers on the Theory of Glaciers," 13th letter) that the veins of stratification were annihilated at a certain point, and that at precisely the same time other veins, approximately at right angles to the former ones, were formed. These effects he referred to intense pressure.

Professor Tyndall ("Glaciers of the Alps," pp. 380, 425-6), agrees with Professor Forbes "in ascribing to the structure a different origin from stratification," and, if I understand him rightly, does not believe that *any* portion of the (approximately) vertical veins have such an origin. He divides the veins into marginal, transverse, and longitudinal structure, and asserts that all are produced by pressure, which causes partial liquefaction of the ice, and that the water is refrozen when the pressure is relieved.

If any one cause produced the whole of the veins of pure ice that are found in the imperfect ice of glaciers (which all are agreed are a constitutional feature of those bodies), it is obvious that that cause would have to be equally generally distributed. It is indisputable that all the veins are not veins of stratification, because examples have been frequently observed crossing (cutting) the strata lines at a larger or smaller angle. But although such observations prove conclusively that all the veins must not be attributed to stratification, they do not prove any more. I believe, with Professor Agassiz, for reasons advanced elsewhere,\* it can be demonstrated, equally conclusively, that many of the veins which are seen in the lower courses of glaciers in the Alps are veins originally produced by stratification, and dissent entirely from the "annihilation" of Principal Forbes. But as it is proved that some have a different origin, we must look to other causes for an explanation. It is probable that the theories quoted above offer a practical solution of the difficulty, although they are unfortified by direct proofs. But I have seen examples which it was difficult to explain by either one or the other.

There is one means by which the veins might be produced, which, if not overlooked, is at least not generally advanced. All glaciers have crevasses; a glacier is known by its crevasses. The sides of all crevasses become more or less weathered and coated with a glaze of pure ice. When they close up again, when the sides join by virtue of regelation, does this leave no trace? Can it be annihilated? Or, do the two coalesced films leave their mark as a vein of pure ice throughout the generally whitish mass of the glacier? I consider a large number of the veins of pure ice which constitute the "veined structure" of glaciers as nothing more than the *scars of healed crevasses*.

It is not easy to say whether this was the meaning of the following passage, taken from p. 201 of Forbes's "Occasional Papers": "Most evidently, also, the icy structure is first induced near the sides of the glacier where the pressure and working of the interior of the ice, accompanied with intense friction, comes into play, and the multitudinous incipient fissures occasioned by the intense strain are reunited by the simple effects of time and cohesion." Judged by his preceding pages, it is not, and I am unaware that it has been, advanced in any other place. Some of your readers may perhaps be able to throw some light upon the subject.

Dec. 13, 1869

EDWARD WHYMPER

## Irish Lepidoptera

IN reply to the note appended to the report of the Dublin Natural History Society's Meeting, Dec. 1st (NATURE, No. 6, p. 176), allow me to say that I perfectly remember the specimen of *Liminitis* to which Mr. Andrews refers, and which he exhibited some years ago as *Liminitis Sibylla* from Tarbert in the county of Limerick. It was subsequently given by him to my friend Mr. A. Dunlop, of Sutton, near Dublin, and sent to me for identification.

I examined it carefully, and it is a specimen of *Liminitis Camilla*, and of *Continental origin*. How it came to be mixed with Mr. Andrews's Irish specimens remains for him to explain.

To say that the insect is neither *Sibylla* nor *Camilla* is absurd; these are the only two species of the genus which inhabit Europe; and *Camilla*, to which Mr. Andrews's specimen belongs, is the most unlikely of the two to occur in Ireland, as *Sibylla* is found in England, but not *Camilla*. However, the insect is in Mr.

\* British Association, 1866 (Nottingham).

Dunlop's Collection, and I am sure that gentleman will have pleasure in allowing anyone to inspect it.

As to *Chrysophanus Virgaurea*, there is no British specimen known, nor is there any trustworthy record of the capture of the species in the British Islands.

*Chrysophanus Hippothoe* (variety *Dispar*) was formerly taken in profusion in the fen districts of Cambridge and Huntingdon, but not that I am aware of in any other part of England. It has been extinct for many years as a British insect, and there is no record of its capture in Ireland at any time. Mr. Andrews's statement that he "met with" *Dispar* in Kerry is indefinite. Did he capture it? or did he only see it, or suppose he saw it? The most experienced collector may mistake an insect on the wing; and delighted as entomologists would be to welcome back the long-lost *Hippothoe*, they will require very different proof of its reappearance to any which has yet been adduced.

EDWIN BIRCHALL

Airedale Cliff, Newlay, near Leeds, Dec. 20, 1869

## Deep Sea Corals

IN the postscript to Mr. J. Gwyn Jeffreys's report on the "Deep-sea Dredging Expedition in H.M.S. *Porcupine*," I notice the following sentence:—"The presence of corals at great depth will also materially alter the views generally received of the depth at which reef-builders may work, and modify to a certain extent Darwin's theory of the reefs and their mode of growth." This opinion has gained much credence, but it is founded upon error, and is a mistake. Count Pourtales has been good enough to send me the commonest corals which he dredged up off Florida and the Havana from depths greater than 100 fathoms. He has forwarded also the description of the species, and a note upon the nature of the *genera* represented in the depths of the Gulf of Mexico, and which have not been as yet described. I have received the greater part of the corals dredged up during the expedition in the *Porcupine*, and have examined the specimens carefully. Being thus acquainted with the deep-sea coral fauna of both sides of the Atlantic, and having a previous knowledge of the species of the Mediterranean, I have no hesitation in asserting that there is not one species found in these deep seas which is "reef-building" in its habit or whose structures resemble those of the true reef forms. Mr. Darwin's theory is therefore as yet as strong as ever.

Dec. 23, 1869

P. MARTIN DUNCAN

## A Meteor

My attention has just been called to an error in my letter of November 6, which appeared in NATURE, p. 58, respecting the meteor of that evening. I refer to the statement that, of the meteor-cloud, the "longest axis was in the line from the north-west point of the horizon to the pole-star." Instead of *north-west*, it should have been *south-west*, or, perhaps, more correctly, S.W. by W.

WM. PENGELLY

Lamorna, Torquay, Dec. 31, 1869

## NOTES

THE trigonometrical survey of England and Wales, on the scale of one inch to a mile, has been completed during the past week. It was commenced in the year 1791.

TELEGRAPHIC connection with Australia is about to be carried out by the British-Australian Telegraph Company. The work will consist of 563 miles of cable from Singapore to Batavia, and will join the Dutch line which crosses to the south-eastern extremity of Java, from which point another cable of 1,163 miles is to be laid to Port Darwin. A land line of about 800 miles will connect this with all the Australian colonies. From England to Singapore the messages will be taken by the Falmouth and Malta, the Anglo-Mediterranean, and the British-Indian Extension Companies; thus forming a complete route.

THE eighth part of Wurtz's *Dictionnaire de Chimie* has just been issued. The *Revue des Cours Scientifiques*, to which we are indebted for this announcement, calls particular attention to the articles *Eaux* and *Composés diazoïques* by M. Gautier, *Dissociation* by M. H. Debray, and *Engrais* by M. Dehérain.

THE Agricultural Academy of Poppelsdorf, near Bonn, has recently sustained a severe loss in the death of its able and ener-

getic director. Dr. Edward Hartstein was not only a man of wide scientific attainments, but a good practical farmer, and thoroughly acquainted with the English and Scotch systems of agriculture in their more advanced phases. Appointed to the directorship of the Poppelsdorf Academy at the early age of 32, he devoted himself heart and soul to the interests of that institution, and to the advancement of agriculture in his native country. He was the author of various works on rural economy, and for some time immediately previous to his death had been busily engaged in working up the materials for a book which should combine the results of his practical experience with the most recent conclusions of the botanist, the chemist, and the physiologist. Dr. Hartstein was born in 1823, and died on the 14th ultimo, a victim to over-work. He was a member of the Royal British Agricultural Society, a distinction which he highly prized.

THE *Engineer* states that a meeting of Government science teachers was held in Manchester on Monday week, when it was resolved to submit to the Department of Science and Art an expression of regret and disapproval of the sudden and unanticipated mode in which that department has repudiated its engagements with the teachers, chiefly with reference to lectures. The received theory that public companies have no conscience seems to be very generally true of public departments, except when they happen to be dealing with interests strongly represented in the House of Commons.

M. LORTET, Professor at the School of Medicine in Lyons, has undertaken the Natural History Course at the Faculty of Sciences in that city, vice M. Jourdan, who retires.

THE Council of the Society of Arts have decided to create a new office, that of Inspector of the Educational Department, and have selected for this appointment Mr. Critchett, who has been for thirteen years Assistant-Secretary. The latter office will not be filled up.

THE series of public lectures on scientific subjects which is given every winter at the Sorbonne commenced on the 23rd ultimo, when M. Fernet discoursed on the subject of optical illusions. The other lectures comprised in this course are as follows:—Jan. 6.—M. Garnier, Mining Engineer, "The Island of Otaheite." Jan. 13.—M. A. Cazin, "The Motor Forces." Jan. 20.—"M. P. Bert, Professor at the Faculty of Sciences of Paris, "Sympathetic Nervous Actions." Jan. 27.—M. Lies-Bodard, Professor at the Faculty of Sciences at Strasbourg, "Ozone." Feb. 3.—M. Janin (of the Institute), "Sound and Light." Feb. 10.—M. Wolf (of the Imperial Observatory), "The Shape of the Earth." Feb. 17.—M. Jansen, "The Eclipse of the 18th August observed in the East Indies." Feb. 24.—M. Bouley (of the Institute), "On Insanity." March 10.—M. Faye (of the Institute), "On the Figure of Comets." March 17.—M. G. Ville, Professor at the Museum of Natural History in Paris, "Theoretical Agriculture." When shall we be able to announce a like series of lectures by men of scientific eminence, as open free to all comers in our own metropolis?

A COMMITTEE has been formed at Leipzig to collect funds for the purchase of the celebrated museum of the late Dr. Klemm, of Dresden. This museum consists of some 14,000 admirably arranged objects, illustrative of what is known in Germany as the history of civilisation. Should the committee succeed in raising sufficient money to attain their purpose, the collection will be handed over to the University of Leipzig, on condition that it is made available for all classes of society. In consideration of the scientific importance of keeping together such a collection as this, the representatives of Dr. Klemm are willing to sell it to the committee for the moderate sum of 10,000 thalers.

THE first number of the *Annales des Sciences Geologiques*, a periodical on the same plan and of the same size as the *Annales des Sciences Naturelles*, has just been issued. M. Hébert, Pro-

fessor of Geology at the Faculty of Sciences of Paris, is the geological editor; M. Alphonse Milne-Edwards undertakes the palæontology. One volume, consisting of four numbers, will be published annually. The greater portion of the number before us is occupied by the first part of an important treatise by M. Louis Lartet, secretary of the French Geological Society, "On the Geology of Palestine and the neighbouring countries." This treatise embodies the observations obtained during the course of the expedition of the Duc de Luynes to the Dead Sea. M. Hébert contributes a paper "On the Lignite-bearing grit of Helsingborg and Höganäs in Southern Sweden."

WE have been requested to contradict the statement contained in our last number, that the *Journal of Botany* will in future be edited by Mr. Henry Trimen, of the British Museum. Dr. Seemann will continue to edit the journal; but greater prominence than hitherto will be given to British Botany, and that department will be under the joint superintendence of Mr. Trimen and Mr. Baker, of Kew.

A SPECIAL JOURNAL for the publication and discussion of observations of shooting-stars and bolidæ is about to appear under the editorship of M. Kieselmeier, of Dresden. It will be published at irregular intervals dependent upon the amount of material in the hands of the editor. The price will be from 2fr. 50c. to 1fr., according to the number of subscribers.

THE culture of the Cinchona, or Peruvian bark, in St. Helena is progressing satisfactorily. The plants are all in excellent health, and have a fine, green, vigorous appearance. There are now about 4000 planted out, and it is thought a sufficient number can be obtained from them to stock the whole colony.

THE Southampton Town Council have decided to adopt the "A B C" process for the utilisation of sewage, and to make such arrangements with the Native Guano Company as may be agreed upon.

AUTHENTIC cases of the successful treatment of snake bites are of some interest. Dr. Bell supplies two in his "New Tracks in North America." On the Rio Grande, in October, 1867, two horses were bitten by the same rattlesnake, while grazing. A few hours afterwards the submaxillary, parotid, and all glands situated about the head and neck were greatly enlarged; from the nostrils and gums, a clear, mucous discharge ran down; the eyes were glairy, with the pupils greatly dilated, and the coat was rough and staring. To each animal Dr. Bell gave half-a-pint of whisky, with a little water, and half an ounce of ammonia, while the wounds were fomented with a strong infusion of tobacco, and afterwards poulticed with chopped tobacco leaves. Both horses recovered. One, although reduced in flesh, and thrown out of condition, was fit for work in a week, but the other only just escaped with his life, becoming a perfect skeleton, and only commencing to mend at the end of three months. Dr. Bell adds that a little weed, common throughout the Western States (called by Engelmann, *Euphorbia lata*, and by Torney, *E. dilatata*), is said to be a specific for the bite of the rattlesnake, but at the very time the plant was wanted it could not be found, although continually met with elsewhere, along the route, so that the experiment could not be tried.

PROFESSOR GIEBEL, of Halle, reports the results of some interesting experiments which he has made with the object of ascertaining the correctness of the popular notion that sparrows are destructive animals, feeding chiefly on grapes and stone-fruit. He found on examining the intestines of seventy-three young sparrows, between the 18th of April and the 24th of June last, that forty-six of them had fed exclusively on insects (beetles, caterpillars, &c.), and seven only exclusively on stone-fruit, the rest having all more or less fed on insects. An examination of forty-six old sparrows gave similar results; three only were fruit-eaters and the rest chiefly insect-eaters.

A HAPPY idea, very ingeniously carried out, is the Pharmaceutical or Medico-Botanical Map, of the World, produced by Mr. George Barber, of Liverpool. In a very clearly printed and carefully-coloured map we are shown at a glance the *habitats* of all the medicinal plants and drugs in general use, as well as the mean annual temperature of the countries whence they are obtained. The map is published by Simpkin, Marshall, and Co.

M. E. LIPPMANN has communicated to the *Annales Industrielles* an account of the operations for sinking the Artesian Well at La Chapelle. The engineers employed by the authorities of the city of Paris to execute this great work, are MM. Degosée, Laurent, and Co. When completed, this well will supply water to one of the most populous quarters of Paris. It is intended that the well shall not only strike the water-bearing stratum—at a depth of about 2,000 feet—into which the great well at Passy penetrates, but shall extend through the stratum to a total depth of 2,950 feet. In this way, other water-bearing layers will be intersected. The work was at first commenced by the ordinary method of sinking a masonry shaft 2 metres (6ft. 3½in.) in diameter to a depth of 445 feet through the tertiary strata which lie above the chalk. Many difficulties presented themselves, chiefly due to the looseness of the earth through which the excavation penetrated, and to the insufficient pumping-power. After two years of persistent labour, it was decided to try another system. At this period the shaft had reached a depth of 113 feet; new boring machinery driven by steam power was now set up, and until the present time the work has proceeded most satisfactorily.

### ASTRONOMY

#### Prizes for the Discovery of Comets

THE following circular has been issued by the Imperial Academy of Sciences at Vienna:—

For several years past there have been remarkably few discoveries of new comets. The cause of this fact, which seems inconsistent with that of the wider distribution of telescopes suitable for such discoveries, may be due to the special attention that has been given to the small planets. It is, however, much to be regretted that there has been such slight increase in our knowledge of the comets, in view of the recently established connection between the shooting stars and the comets. It is exceedingly desirable that we should know more than two or three hundred out of the many thousands of comets which undoubtedly belong to our system, especially as most of those which we know move in parabolic orbits. Were our knowledge of comets more complete we should surely know of more meteor streams and comets belonging one to the other. Mindful of Herr Schumacher's words "it is natural that astronomers intrusted with the administration of a well furnished observatory should have no time left for sweeping the sky so minutely and so perseveringly as is necessary for discovering these faint bodies, whilst, on the contrary, it seems certain that to the many amateur astronomers who have less extensive means of observation hardly any more useful kind of activity could be recommended," the Imperial Academy of Sciences at Vienna is induced to propose for the discovery of comets during the three years from May 31, 1869, to May 31, 1872 eight prizes annually, consisting, as the receiver may choose, of a gold medal, or of twenty Austrian ducats representing its value in money.

The award of these prizes will be subject to the following regulations:—

1. The prize will be given only for the first eight comets discovered in each of the three years named, and only for such comets as are telescopic at time of discovery, that is, invisible to the naked eye. The comet must not have been before seen by another observer, and must be one whose appearance could not be predicted with certainty.

2. The discovery must be communicated immediately and without waiting for further observations, to the Imperial Academy of Sciences, by telegraph if practicable; and otherwise by the earliest post. The Academy undertakes to transmit the news immediately to other observatories.

3. The time and place of discovery with the plan and course

of the comet must be given as exactly as possible with the first notice. This first notice is to be supplemented by such later observations as may be made.

4. If the discovery should be confirmed by other observers, the prize will not be awarded unless the observations of the discoverer suffice for the determination of the orbit.

5. The prizes will be awarded in the general meeting of the Academy held at the end of May of each year. In case the first notice of a discovery arrives between the 1st of January and the end of May, the final award of the prize will be deferred till the general meeting in May in the following year.

6. Application for the prize must be made to the Academy within five months from the time of the arrival of the first notice. Later applications will not be considered.

7. The Imperial Academy will procure the decision of the permanent astronomers of the Observatory at Vienna as to the fulfilment of the conditions in Nos. 1, 3, and 4.

#### The New Planet (109)

In the *Astronomische Nachrichten*, 1779-80, there is a long and important article on Piazzi's observations by M. Argelander; also the approximate place of this planet, discovered by Prof. Peters of Clinton, New York.

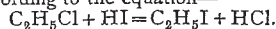
The following elements of the Planet are by Prof. Peters, and are considered by him to be nearly accurate. We print in a parallel column the elements for the same planet as furnished by Prof. Axel Möller, of Lund. The latter are calculated from observations taken at Clinton on Oct. 13th, Leipzig Nov. 8th, and Lund Nov. 26th, 1869:—

| Epoch 1869,                   | Oct. | 0.0 Berlin mean time.  |
|-------------------------------|------|------------------------|
| $M_0 = 337^\circ 1' 3' 35''$  |      | $350^\circ 53' 28.6''$ |
| $\pi = 55^\circ 53' 48.0''$   |      |                        |
| $\Omega = 4^\circ 51' 45.4''$ |      | $4^\circ 57' 30''$     |
| $i = 7^\circ 56' 56.55''$     |      | $8^\circ 3' 57.8''$    |
| $\phi = 17^\circ 25' 14.13''$ |      | $17^\circ 27' 51.0''$  |
| $\mu = 809'' 580$             |      | $800'' 476$            |
| $\log a = 0.4278314$          |      |                        |

### CHEMISTRY

#### Transformation of Chlorinated into Iodated Compounds

AD. LIEBEN has made important experiments on this kind of transformation. Ethyl chloride, mixed in a sealed tube with three or four times its weight of strong hydriodic acid, sp. gr. 1.9, and heated for five hours to 130°, is almost wholly converted into ethyl iodide, according to the equation—

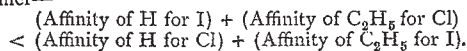


In like manner ethylated ethyl chloride (butyl chloride), and amyl chloride are converted by strong hydriodic acid into the corresponding iodides, without formation of secondary products.

Ethyl-chlorinated ethyl oxide  $C_2H_5(C_2H_5Cl)O$  is converted,

by an excess of strong hydriodic acid, chiefly into ethyl iodide, and ethylated ethyl iodide (butyl iodide); but there are also some secondary products formed, viz. butyl chloride, alcohols, and a substance having a carbonaceous aspect, the quantity of these secondary products increasing as the hydriodic acid is less concentrated and present in smaller quantity.

To determine whether the action of hydriodic acid is a simple double decomposition or a case of the action of masses, the converse reaction was tried by heating ethyl iodide with a considerable excess of hydrochloric acid in a sealed tube to 130°. A small quantity of ethyl-chloride was thereby obtained, together with hydriodic acid and free iodine, showing that the inverse of the first-described reaction does really take place; but the quantity of ethyl chloride, which it yields, is very small, even when the action is continued for 50 hours. The result of the two supplementary experiments, namely, the decomposition of ethyl chloride by hydrogen iodide, and of ethyl iodide by hydrogen chloride, may be represented, though somewhat crudely, in the following manner—



The decomposition of ethyl chloride, and its homologues by the action of hydriodic acid, is analogous to the decomposition of silver iodide by the same reagent.

As an example of the action of hydriodic acid on organic chlorides of other series, *chloroform*  $CHCl_3$  was introduced, together with 11 times its weight of hydriodic acid of sp. gr. 1.9,